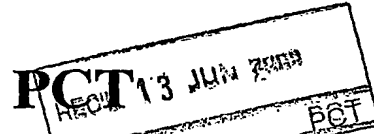


# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
JOHN E. NEMAZI  
BROOKS KUSHMAN  
1000 TOWN CENTER  
TWENTY-SECOND FLOOR  
SOUTHFIELD, MICHIGAN 48075



## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (day/month/year) <b>10 JUN 2005</b>	
Applicant's or agent's file reference <b>MEDE0101PCT</b>	
<b>FOR FURTHER ACTION</b> See paragraph 2 below	
International application No. <b>PCT/US05/02625</b>	International filing date (day/month/year) <b>31 January 2005 (31.01.2005)</b>
Priority date (day/month/year) <b>30 January 2004 (30.01.2004)</b>	
International Patent Classification (IPC) or both national classification and IPC <b>IPC(7): B21D 22/00; B23P 15/14; B21K 1/30; B21D 53/26 and US Cl.: 72/352, 353.2, 358; 29/893.3, 893.34, 893.36</b>	
Applicant <b>OYEKANMI, BAMIDELE O</b>	

1. This opinion contains indications relating to the following items:

- ☒ Box No. I      Basis of the opinion
- ☐ Box No. II      Priority
- ☐ Box No. III      Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV      Lack of unity of invention
- ☒ Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI      Certain documents cited
- ☐ Box No. VII      Certain defects in the international application
- ☐ Box No. VIII      Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Eric B. Compton Telephone No. (571) 272-4050
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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US05/02625

**Box No. I Basis of this opinion**

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/02625

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>1-10, 12-19</u>	YES
	Claims <u>11, 20</u>	NO
Inventive step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-20</u>	NO
Industrial applicability (IA)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/02625

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

1. Claims 1-20 meet the criteria set out in PCT Article 33(4), and thus meet industrial applicability because the subject matter claimed can be made or used in industry.

2. Claims 11 and 22 lack novelty under PCT Article 33(2) as being anticipated by WO 02/078876 to Roeske et al ("Roeske"). Roeske discloses a forged article, e.g., a ring gear, having a negative tooling pattern. See Figures 12-14.

Note: Even though product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

3. Claims 1-4, 6-10, 12-15, and 17-19 lack an inventive step under PCT Article 33(3) as being obvious over WO 02/078876 to Roeske et al ("Roeske") in view of U.S. Pat. 4,709,569 to Sabroff et al ("Sabroff").

Roeske discloses a method of manufacturing a ring gear (39) including a surface having teeth (6), the method comprising: defining a negative tooling pattern (66) based on the surface;

providing a tooling set having a bottom die (53), a top die (52) and an anvil (64), the bottom die being formed with an upper die surface (66) that conforms to the negative tooling pattern, the anvil extending through the bottom die and defining an axis, the bottom die and the top die cooperating to define a die cavity (see Fig. 24);

placing an annular blank (35) on an anvil and into the die cavity between a top die and the bottom die (see Fig. 21); and

pressing the annular blank between the top and bottom dies in a pressing direction that is generally parallel to the axis to form the ring gear in single stroke, the annular blank initially flowing in the pressing direction to substantially completely form the surface of the ring gear and thereafter flowing in a direction generally perpendicular to the pressing direction to thereby fill the die cavity. Roeske discloses the invention above, and hot forging. See Page 12, lines 1-5. However, the reference does not disclose preheating the annular blank formed of ferrous material to forging temperature selected  $T_w$  release to the melting temperature  $T_m$  of the material so that the homologous absolute temperature ratio  $T_w/T_m$  is between 0.62 and 0.80.

Sabroff discloses a method of forming a gear by hot forging. Like, Roeske a hollow ring shaped billet (20) is forged to produce the gear. Sabroff discloses "In a typical example, a billet of AISI 8620A steel, a common low to medium carbon level alloy steel, is heated to a preselected temperature of about 1800 °F. (1255 °K.) to 1900 °F. (1310 °K.). As AISI 8620A steel has a melting temperature of about 2800 °F. (1810 °K.), the resulting HTR is in the range of 0.693 (1255/1810) to 0.723 (1310/1810)." Col. 3, lines 57-63. The homologous temperature ratio (HTR) is defined as the temperature (°K) of the material divided by the melting temperature (°K) of the material. See Col. 3, lines 35. Sabroff further discloses that "The process has been found to provide good machinability of the precision forgings as the microstructure is a polygonal ferrite and pearlite equiaxed grain with no, or only a minimum of, undesirable Widmanstatten structure. The grain size is generally fine (i.e. less than G.S. No. 10 on the ASTM Scale)." Col. 4, lines 23-29.

Regarding claims 1 and 12, it would have been obvious to one having ordinary skill in the art at the time of invention to have formed the gear of Roeske by preheating the annular blank formed of ferrous material to forging temperature selected  $T_w$  release to the melting temperature  $T_m$  of the material so that the homologous absolute temperature ratio  $T_w/T_m$  is between 0.62 and 0.80, in light of the teachings of Sabroff, in order to "provide good machinability of the precision forgings." Id.

Regarding claims 2 and 13, Sabroff teaches the homologous temperature ratio is preferable 0.693 to 0.723. See Col. 3, lines 57-63.

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In case the space in any of the preceding boxes is not sufficient.

Regarding claims 3 and 14, Sabroff teaches preheating the blank to a temperature of about 1800 to 1900 degrees Fahrenheit. See Col. 3, lines 57-63.

Regarding claims 4 and 15, Sabroff teaches "The grain size is generally fine (i.e. less than G.S. No. 10 on the ASTM Scale)." Col. 4, lines 28-29. Note: Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established.

Regarding claims 6 and 17, Roeske discloses forging the article to near-net shape. See Page 11, lines 5-9. Likewise, Sabroff discloses the forging may be near-net. See e.g., Col. 2, lines 33-34.

Regarding claims 7 and 18, Roeske discloses the forming the annular blank such that it conforms to a predetermined volumetric size to thereby control a weight of the forged article. See Page 10, lines 13-15.

Regarding claim 8, Roeske discloses sectioning a tube shape billet to create the annular blank. See Page 10, lines 18-19. Likewise, Sabroff disclose this step as well. See Col. 3, lines 16-18.

Regarding claim 9, Roeske discloses removing an amount of excess from a second surface of the forged article opposite the surface. See Page 12, lines 18-22 (discussing machining surface 41 opposite the gear surface).

Regarding claim 10, Roeske discloses the annular blank (35) is ring shaped. See e.g., Figure 21. Likewise, Sabroff disclose the annular blank is ring shaped. See Figure 2.

Regarding claim 19, Roeske discloses forming during the forging pressing operation a series of fluid holes (formed by projections 125). See Figure 35.

4. Claims 5 and 16 lack an inventive step under PCT Article 33(3) as being obvious over WO 02/078876 to Roeske et al ("Roeske") in view of U.S. Pat. 4,856,167 to Sabroff et al ("Sabroff") and in further view of U.S. Pat. 5,787,753 to Dougherty. Roeske and Sabroff disclose the inventions above. However, the references do not disclose coating the annular blank with a lubricant. Dougherty discloses a method of forging a gear with near net shape. The reference teaches "The workpiece can be coated or soaked with a lubricant, such as graphite, which assists in enhancing the flow of metal along the surfaces of tooth die 26, stencil die 30 and stem cavity 84 (e.g., interior surface 85 and recess 83A), which in turn, assists in reducing the possibility that the forged gear 90 will seize to surfaces of the tooth die 26, stencil die 30, or stem cavity 84 after the forging stroke." Col. 6, lines 47-53.

Regarding claims 5 and 16, it would have been obvious to one having ordinary skill in the art at the time of invention to have formed the gear of Roeske and Sabroff by coating the annular blank with a lubricant, in light of the teachings of Dougherty, in order to "assist in enhancing the flow of metal" during forging. Col. 6, lines 48-49.

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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US05/02625

**Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims <u>1-10, 12-19</u>	YES
	Claims <u>11, 20</u>	NO
Inventive step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-20</u>	NO
Industrial applicability (IA)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

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Supplemental Box

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V. 2. Citations and Explanations:

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3. Claims 1-4, 6-10, 12-15, and 17-19 lack an inventive step under PCT Article 33(3) as being obvious over WO 02/078876 to Roeske et al ("Roeske") in view of U.S. Pat. 4,709,569 to Sabroff et al ("Sabroff").

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